Curriculum Vitae

Michael G. Tosca, Jr.

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EDUCATION

Ph.D., Earth System Science	University of California, Irvine	March, 2012
M.S., Earth System Science	University of California, Irvine	February, 2009
B.S., Mathematics-Statistics	University of Connecticut	May, 2006
cum laude, with honors		

PROFESSIONAL APPOINTMENTS

Research Scientist
July 2015 – Present
NASA JPL/UCLA; Clouds & Aerosols Group
Affiliation: JIFRESSE, MISR instrument group

Postdoctoral Scholar
July 2012 – July 2015
NASA JPL/Caltech; Clouds & Aerosols Group
Advisor: Dr. David Diner

Postdoctoral Specialist
March 2012 – July 2012
U.C. Irvine; Dept. Earth System Science
Advisor: Dr. James Randerson

Graduate Student Researcher
Sept. 2006 – March 2012
U.C. Irvine; Dept. Earth System Science
Advisors: Drs. James Randerson and Charles Zender

Undergraduate Researcher
Sept. 2004 – Dec. 2005
U. Conn.; Dept. Natural Resources Management & Engineering
Advisor: Dr. April Hiscox

AWARDS/GRANTS

NASA Research Opportunities in Space and Earth Science (ROSES)
Atmospheric Composition Campaign Data Analysis and Modeling Sept. 2014 – Sept. 2017*
Co-Investigator; $250k/year (total award)
Scientific analysis of aircraft polarimetric/radiometric data

NASA Earth System Science Graduate Fellowship Sept. 2008 – Sept. 2010
3-year renewable fellowship; $30,000 / year

Undergraduate Degree with Honors Distinction May 2006
Honors Thesis: 'New England Winter Climate Change: Relating Temperature and Precipitation to Changes in Annual Snowfall Totals'; Advisor: Dr. Anji Seth, Department of Geography

PUBLICATIONS

Tosca, M.G., J.R. Campbell, O.V. Kalashnikova, M.J. Garay, F.C. Seidel (2015), An analysis of atmospheric aerosol and temperature trends in the Southeast United States with applications to the 2013 SEAC^{4}RS campaign, *Geophys. Res. Lett.,* in prep.

Tosca, M.G. (2015), Do man-made fires inhibit tropical cyclone growth in the Atlantic?, *Environ. Res. Lett.,* in prep.

Tosca, M.G., O.V. Kalashnikova, M.J. Garay, D.J. Diner, J.T. Randerson (2015), Human caused fires limit convection in tropical Africa: First temporal observations and attribution, *Geophys. Res. Lett.,* in press.

Tosca, M.G., D.J. Diner, M.J. Garay and O.V. Kalashnikova (2014), Observational evidence of fire-driven reduction of cloud fraction in tropical Africa, *J. Geophys. Res.*, 119, 8418-8432, doi:10.1002/2014JD021759.

Tosca, M.G., J.T. Randerson and C.S. Zender (2013), Global impact of contemporary smoke aerosols from landscape fires on climate and the Hadley circulation, *Atmos. Chem. Phys.,* 13, 5227-5241, doi: 10.5194/acp-13-5227-2013.

Zender, C.S., A.G. Krolewski, **M.G. Tosca** and J.T. Randerson (2012), Tropical biomass burning smoke plume shape, reflectance, and age based on 2001—2009 MISR imagery of Borneo, *Atmos. Chem. Phys.,* 12, 3437-3454, doi: 10.5194/acp-12-3437-2012.

Tosca, M.G., J.T. Randerson, C.S. Zender, D.L. Nelson, D.J. Diner and J.A. Logan (2011), Dynamics of fire plumes and smoke clouds associated with peat and deforestation fires in Indonesia, *J. Geophys. Res.*, 116, D08207, doi: 10.1029/2010JD015148.

Tosca, M.G., J.T. Randerson, C.S. Zender, M.G. Flanner and P.J. Rasch (2010), Do biomass burning aerosols intensify drought in equatorial Asia during El Niño?, *Atmos. Chem. Phys.,* 10, 3515-3528, doi: 10.5194/acp-10-3515-2010.

SELECTED PROFESSIONAL PRESENTATIONS

Tosca, M.G., Aerosol climatology in the Southeast US and applications to SEAC4RS campaign (2013), presented by M.G. Tosca at the SAS Modeling Workshop, June, 2015; Princeton, NJ (oral).

Tosca, M.G., Aerosol climatology in the Southeast US and applications to SEAC4RS campaign (2013), presented by M.G. Tosca at the SEAC4RS Science Team Meeting, May, 2015; Pasadena, CA (oral).

Tosca, M.G., Human amplification of drought-driven fire in tropical regions, presented by M.G. Tosca at the European Geoscience Union General Assembly, April, 2015; Vienna, Austria (oral).

Tosca, M.G., Convective cloud inhibition attributed to dust and smoke aerosols in sub-Saharan Africa, presented by M.G. Tosca at the American Meteorological Society Annual Meeting, January, 2015; Phoenix, AZ (oral).

Tosca, M.G., Observational evidence of fire-driven reduction of tropical cloud fraction, presented by M.G. Tosca at the EGU General Assembly, May, 2014; Vienna, Austria (oral).

Tosca, M.G., Observational evidence of fire-driven changes in cloud microphysics in convective regions, presented by M.G. Tosca at the AGU Fall Meeting, December 13, 2013; San Francisco, CA (poster)

Tosca, M.G., Evaluating the cloud microphysical response to fire aerosols in southeast Asia using satellite observations: an approach, presented by M.G. Tosca at the MISR User's Symposium, December 12, 2012; Pasadena, CA (oral)

Tosca, M.G., Evaluating the cloud microphysical response to fire aerosols in southeast Asia using satellite observations: an approach, presented by M.G. Tosca at the AGU Fall Meeting, December 3, 2012; San Francisco, CA (oral)

Tosca, M.G., J.T. Randerson and C.S. Zender, Assessing the remote effects of fire emissions on tropical ecosystems using CESM, presented by M.G. Tosca at the 17th Annual CESM Workshop, June 18, 2012; Breckenridge, CO (poster)

Tosca, M.G., Fire and smoke in the Earth system: Evaluating the impact of fire aerosols on regional and global climate, presented by M.G. Tosca at NASA Jet Propulsion Laboratory (job talk), March 1, 2012; Pasadena, CA (oral)

Tosca, M.G., J.T. Randerson and C.S. Zender (2011), Quantification of regional radiative impacts and climate effects of tropical fire aerosols, presented by M.G. Tosca at AGU Fall Meeting, December 2011; San Francisco, CA (oral)

Tosca, M.G., J.T. Randerson and C.S. Zender (2011), Quantification of regional radiative impacts and climate effects of tropical fire aerosols, presented by M.G. Tosca at MISR User Symposium, December 2011; Pasadena, CA (oral)

Tosca, M.G., J.T. Randerson and C.S. Zender, Simulating the climate impacts of fire using a global climate model, poster presented by M.G. Tosca at the NASA Carbon Cycle & Ecosystems Workshop, October 3, 2011; Washington D.C. (poster)

Tosca, M.G., J.T. Randerson and C.S. Zender, Feedback between fire and ENSO: Scaling emissions and developing a semi-prognostic fire module for CAM5, poster presented by M.G. Tosca at the 16th Annual CESM Workshop, June 20, 2011; Breckenridge, CO (poster)

Tosca, M.G., J.T. Randerson, C.S. Zender, M.G. Flanner, D.L. Nelson, D.J. Diner, P.J. Rasch and J.A. Logan, Characteristics of Borneo and Sumatra fire plumes and smoke clouds and their impact on regional El Niño-induced drought, presented by M.G. Tosca at the EGU General Assembly 2010, May 3, 2010; Vienna, Austria (oral)

Tosca, M.G., J.T. Randerson and C.S. Zender, Characteristics of fire plume heights and smoke clouds on Borneo and Sumatra, poster presented by M.G. Tosca at the NASA LCLUC Spring Team Meeting, April 22, 2010; Bethesda, MD (poster)

Tosca, M.G., J.T. Randerson, C.S. Zender, D.L. Nelson, D.J. Diner and J.A. Logan, Characteristics of fire plume heights and smoke clouds on Borneo and Sumatra, poster presented by M.G. Tosca at the AGU Fall Meeting, December 15, 2009; San Francisco, CA (poster)

Tosca, M.G., J.T. Randerson, C.S. Zender, D.L. Nelson, D.J. Diner and J.A. Logan, Characteristics of fire plume heights and smoke clouds on Borneo and Sumatra, poster presented by M.G. Tosca at the MISR User Symposium, December 9, 2009; Pasadena, CA (poster)

Tosca, M.G. and S.B. Capps, Solar energy and the Earth's energy budget, presented by M.G. Tosca and S.B. Capps at the Summer Science Institute, August 10, 2009; Irvine, CA (oral)

Tosca, M.G., J.T. Randerson, C.S. Zender, D.L. Nelson, D.J. Diner and M.G. Flanner, Tropical fire emissions injection heights and their impact on climate, poster presented by M.G. Tosca at the AGU Fall Meeting, December 17, 2008; San Francisco, CA (poster)

Tosca, M.G., J.T. Randerson, C.S. Zender, D.L. Nelson, D.J. Diner and M.G. Flanner, Tropical fire emissions injection heights and their impact on climate, poster presented by M.G. Tosca at the MISR User Symposium, December 11, 2008; Pasadena, CA (poster)

Tosca, M.G., J.T. Randerson, C.S. Zender, M.G. Flanner and P.J. Rasch, Do biomass burning aerosols intensify drought in equatorial Asia during El Niño?, presented by M.G. Tosca at the Marie-Curie iLEAPS Feedback and Land-Climate Dynamics Conference, November 16-20, 2008; Hyeres, France (oral)

PROFESSIONAL WORKSHOPS

Marie-Curie iLEAPS Feedback and Land-Dynamics Conference *Hyeres, France*
November 16-20, 2008

AIMES 4th YSN Workshop: Cultural Uses and Impacts of Fire: Past, Present and Future
July 14-28, 2008 *Boulder, CO*

FIELD CAMPAIGNS

Studies of Emissions and Atmospheric Composition, Clouds and Climate Coupling by Regional Surveys (SEAC^{4}RS) *Houston, TX*
August – September, 2013

TEACHING

Meteorology Instructor at Waldorf High School, Costa Mesa, CA *2010—2012*
(10th grade)
SAT/ACT Prep Instructor at Waldorf High School *2011—2012*
(10th, 11th and 12th grades)
Teaching Assistant, Earth System Science 1, "The Physical Environment" *Winter 2008*
-Guest Lecture: Earth's radiation budget

Teaching Assistant, Earth System Science 55, "Earth's Atmosphere" *Spring 2008*
-Guest Lecture: Small-scale winds
Teaching Assistant, Earth System Science 1, "The Physical Environment" *Fall 2009*
-Guest Lecture: Water vapor and aerosols

ONGOING RESEARCH PROJECTS

~Tropical biomass burning aerosols; direct, semi-direct, indirect effects on climate and meteorology using regional & global models, remote sensing observations and aircraft measurements
~Tropical fire smoke plume dynamics, characterization and modeling
~Atmosphere-ocean-biosphere links to tropical biomass burning & climate modes (ENSO, etc.)
~Influence of aerosol burden and vertical distribution on trends in temperature and precipitation.
~Aerosol-cloud radiative and microphysical interactions and their effect on precipitation rates

OUTREACH

~ Regular presenter for C.L.E.A.N. non-profit organization for grades 1-9 *since 2009*
~ "Interactive water resources games" presented to: grade 9 (ComptonH.S.),
grades 3-5 (Children's Water Education Festival) *2010, 2011, 2012*
~ "California's Changing Climate" presented to grades 1-3 (Hick's Canyon Elementary)
and grades 3-5 (Children's Water Education Festival) *2008, 2009*

OTHER RELATED INTERESTS

~Mid-latitude weather forecasting, analysis, blogging & storm chasing
~California's climate and ecosystems